Remarks:

Reconsideration of the application is requested. Claims 1, 4-19, and 22-34 are now in the application. Claims 1, 16-19, 32, and 34 have been amended. Claims 2-3 and 20-21 have been canceled.

In item 2 of the above-identified Office action, the Examiner has rejected claims 1-34 as being indefinite under 35 U.S.C. § 112, second paragraph. The particular rejections will be answered in the following paragraph, in the order that they were presented.

In claim 1, the Examiner rejected the term "producing". Claim 1 has been amended to include the features of claims 2 and 3, which further define the producing step. Amended claim 1 now defines "producing" as being one of "patterning" and "planarizing". This additional information makes claim 1 definite.

The Examiner rejected the phrase "the precious metal material" as lacking antecedent basis. However, the fourth paragraph of the claim reads:

> applying a catalytically active connection region to the substrate, the catalytically active connection region being a precious metal material selected from the group consisting of a precious metal and an oxide of a precious metal. (Emphasis added by Applicants.)

Accordingly, the rejected phrase does in fact have antecedent basis within the claim. In response to the Examiner's question, the precious metal material is the same as the precious metal material that forms the catalytically active connection region.

The Examiner rejected the verb "passing" as not clearly stating what the step entails. While the verb "pass" has many meanings, in the context of the invention, the applicable definition taken from Webster's dictionary would be "7b(1): to transfer or transmit from one to another." Therefore, in context of the claim "passing an organometallic compound of a precious metal to the substrate" means to transfer the organometallic compound to the substrate.

In claim 1, the Examiner rejected the phrase "the insulation region" as lacking antecedent basis. Claim 1 has been amended to properly introduce the insulation region.

With regard to the term "passing" in claims 4 and 5, the word is given the same meaning as used above.

In claim 6, the Examiner rejected the terms "Cp" and "Cp*". These terms are defined in the specification on page 14, lines 2-5. Cp is an abbreviation for Cylopentadienyl. Cp* is an

abbreviation for Pentamethylcyclopentadienyl. Therefore, in light of the specification, these terms are definite.

In claims 12 and 13, the Examiner was not clear whether the "elements" listed were present before or after the depositing step. The purpose of these claims is merely to explicitly include the listed elements and oxides. The claims are not intended to limit the claim by a timing of the inclusion. Therefore, the elements and oxides are included throughout (before and after) the depositing step. Support for this understanding can be found in the specification on page 14, lines 14-19.

The Examiner rejected claims 14 and 30 for being unclear as to which precious metal of claims 1 and 19, respectively, was being further described in the dependent claims. As stated previously, only one instance of "precious metal" is being described in each of the independent claims.

The Examiner rejected claims 16 and 32 for using an indefinite term "hard". However, because the term "hard mask" is a term of art and not a description of the relative hardness of the mask, this term is in fact definite. To provide additional background, generally, two different types of masks exist. One kind is photomasking where the mask is a material that can be structured by light. The other type of mask is a so-called

"hard mask". A hard mask could be made, for instance, of siliconoxide or the like. The structuring of a hard mask is not as "easily" done with light as it is on photomasks. Generally, these masks are more resistant than a photoresist, therefore, they have been given the name "hard mask". A search of the Patent Office database for the term "hard mask" yields 2,614 entries. This evinces that the term has been widely adopted within the field of the invention. Therefore, in light of the industry adoption of the term "hard mask" it is definite for purposes of the examination.

The Examiner rejected the phrase "the insulation region" in claim 17 as lacking antecedent basis. Claim 17 has been amended to clarify that the insulation region is the catalytically inactive insulation region that was introduced in claim 1.

In claims 19 and 20, the Examiner rejected the term "producing" as being confusing. Claim 19, like claim 1, has been amended to include the features of claims 20 and 21, which further describe how the producing step is accomplished. In light of these changes, claim 19 is definite.

Accordingly, the specification and the claims meet the requirements of 35 U.S.C. § 112, second paragraph. Should the Examiner find any further objectionable items, counsel would

appreciate a telephone call during which the matter may be resolved. The changes are neither provided for overcoming the prior art nor do they narrow the scope of the claim for any reason related to the statutory requirements for a patent.

In item 3 of the Office action, the Examiner rejected claims 1-34 as being obvious over Hsu (U.S. 5,320,978) in view of Xue et al. combined with Ha et al. (5,970,309) or JP 09-289,291 or JP 08-222,711 under 35 U.S.C. § 103(a). As will be explained below, claims 2 and 3, which have been integrated into claim 1, and claims 20 and 21, which have been integrated into claim 19, were patentable over the cited art in their original form and the claims have, therefore, not been further amended to overcome the references.

Before discussing the prior art in detail, a brief review of the invention as claimed is provided. Claim 1 calls for, *inter alia*, a method for fabricating a precious-metal electrode for a storage capacitor that includes the following steps:

> providing a substrate;
>
> applying a catalytically inactive insulation to the substrate to form a catalytically inactive insulation region of the substrate;
>
> applying a catalytically active connection region to the substrate, the catalytically active connection region being a precious metal material selected from

the group consisting of a precious metal and an oxide of a precious metal;

producing the catalytically active connection region and the catalytically inactive insulation region by one of:

patterning the connection region, and

planarizing the connection region and the insulation region; and

depositing selectively the precious metal material on the catalytically active connection region by passing an organometallic compound of a precious metal to the substrate at a temperature from 0° to 120°C. (Emphasis added by Applicants.)

Claim 19 has similar features as claim 1.

Hsu (U.S. 5,320,978)

Hsu discloses a process for selectively depositing a platinum film on a substrate. The substrate 10 and a polyimide pattern 12 are at first exposed to a H_2SO_4 and H_2O_2 solution, afterwards to a HF solution. Then the whole device is placed in a vacuum chamber 20, where it is heated to an operating temperature by the heater 18. By adjusting the temperature, the pressure, the platinum containing material, and the precursor treatment time, the platinum metal 24 adheres only to the portion of the sample 13 that is not covered by the polyimide.

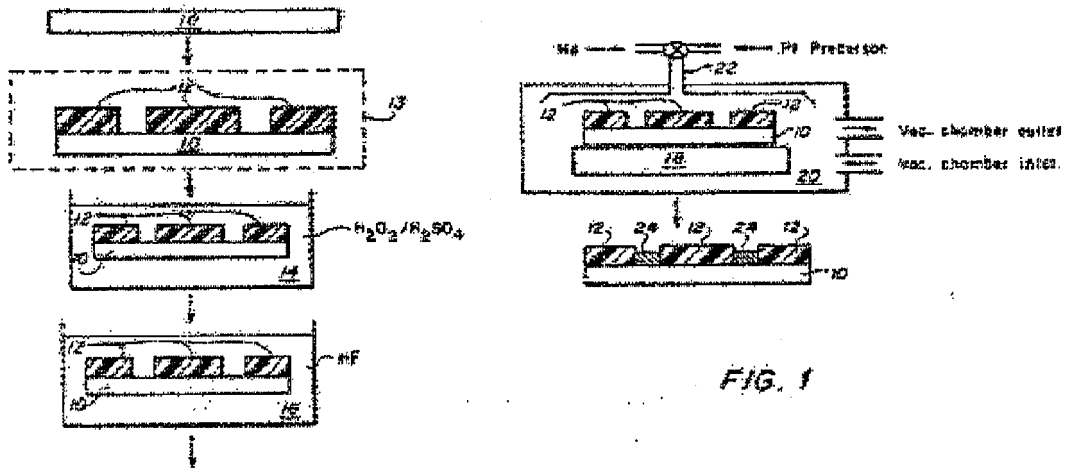


FIG. 1

However, Hsu discloses a temperature of at least 150°C. *See* col. 2, line 57.

In contrast, claim 1 of present invention claims a temperature between 0°C and 120°C.

Furthermore, Hsu fails to disclose the deposition of the precious metal material by passing an organometallic compound of a precious metal.

Furthermore, Hsu fails to disclose the catalytically active connection region is produced by patterning or planarizing the connection region.

In Hsu, the catalytically active regions are the parts of the substrate that are not covered by the polyimide.

Hsu does not teach or suggest that catalytically active regions or the parts covered by the polyimide are neither patterned nor planarized.

Xue et al.:

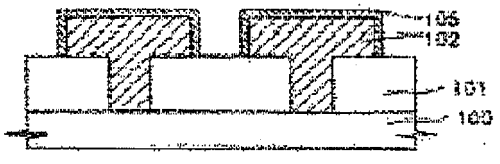
The cited article "Organometallic Chemical Vapor Deposition of Platinum. Reaction Kinetics and Vapor Pressures of Precursors." by Xue et al. describes the depositing of platinum layers made of organometallic materials. Temperatures in the range of 25°C and 180°C are taught to be appropriate.

In contrast, claim 1 and 19 of present invention claims a temperature between 0°C and 120°C.

Ha et al. (US 5,970,309):

Ha et al. teach a method of manufacturing a semiconductor capacitor electrode by growing selectively a metal compound layer 105 over polysilicon storage nodes 102, as depicted in Fig. 2B.

FIG.2B



However, in Ha et al., the metal compound layer 105 consists of WN_x, a nitride, or a carbide of a metal selected from the group consisting of W, Mo, Ti, Ta, or Zr (compare col. 2, 39-43). That is, Ha et al. teaches methods for depositing refractory metals.

In contrast, the present invention teaches methods for depositing precious metals. As described on page 4 of the present application, the use of the new paraelectrics or ferroelectrics requiring new electrode materials. The processing takes place at high temperatures at which commonly used electrode materials, including the materials discussed in Ha et al., suffer from oxidizing, which lead to the memory cell failure. The oxidizing problem can be overcome by the use of precious materials such as platinum. However, these materials are difficult to handle, especially to pattern.

Therefore, according to our understanding, a person skilled in the art would not combine Hsu, Xue et al. and Ha et al. as Ha et al. are not concerned with depositing precious materials.

Furthermore, Ha et al. teach selectively forming WN_x over the storage nodes 102, but not over portions of the insulating layer 101. The forming is carried out by depositing using LPCVD (*see* column 3, lines 43 to 45 of Ha et al.). However, Ha et al. provide no further information on the exact process.

In contrast, the present invention claims a particular (i.e. a species) process of depositing. The catalytically active regions make the organometallic compounds decompose on their surface while these compounds are not affected by the surface of the catalytically inactive regions. The decomposition then leads to the deposition of the precious metal.

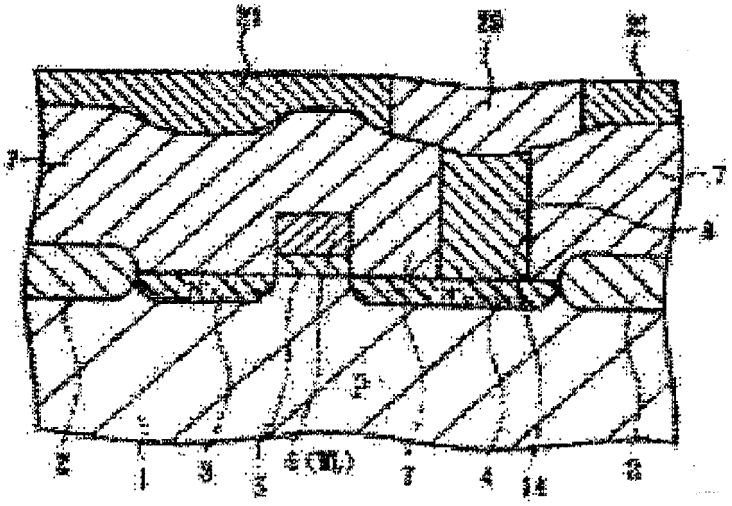
A person skilled in the art could not conclude from Ha et al. the claimed selective deposition process. Therefore, that person would haves no reason to combine the teachings of Ha et al. with the combination of Hsu and Xue et al.

JP 09-289,291 and JP 08-222,711:

It is not possible to see from the abstract and the drawings to what extent these documents anticipate important aspects of the present invention. However, from the abstract and the drawings, Japanese patent JP 09-289,291 that reference number 29 refers to the lower electrode and reference number 21 to an oxide film. We assume that the Examiner thus refers to reference number 8 as being the catalytically active region and to the layer 7 as being the catalytically inactive region. However, as evinced by the large overlap of the lower electrode 29 over the plug 8, JP 09-289,291 teaches a conventional method for producing the lower electrode: that is a deposition of a Pt-layer followed by an etch process. As explained in the present application, this kind of production

method is prior art and has all of the disadvantages mentioned in the Background section of the present application. Particularly, the size of the electrodes is restricted to a size producible with this kind of process. Therefore, a person skilled in the art would not consider to combine the other cited documents with JP 09-289,291.

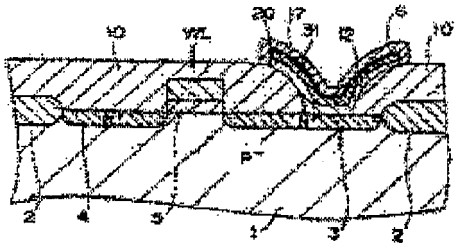
【図10】



The abstract and the drawings of JP 08-222,711 teach that reference number 6 refers to the Pt electrode and 17 to the ferroelectric film. However, it is not clear why a person skilled in the art should consult JP 08-222,711 when concerned with the topic of the present invention. There is no process of selectively depositing precious material on a catalytically active region. It is quite clear from the drawings,

especially Figs. 9 and 10, that the deposition is carried out in a process well known in the art, that is, by firstly depositing a layer, then masking it, etching it and removing the masking layer.

【図14】



Conclusion:

Accordingly, none of the references, whether taken alone or in any combination, either show or suggest the features of claim 1 or 19. Therefore, claims 1 and 19 are patentable over the art. Moreover, because all of the dependent claims are ultimately dependent on claim 1 or 19, they are believed to be patentable as well.

In view of the foregoing, reconsideration and allowance of claims 1, 4-19, and 22-34 are solicited. In the event the Examiner should still find any of the claims to be unpatentable, please telephone counsel so that patentable language can be substituted.

If an extension of time for this paper is required, petition for extension is herewith made.

Please charge any other fees that might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of Lerner and Greenberg, P.A., No. 12-1099.

Respectfully submitted,

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LDP:cgm

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